

Warmup!

Solve.

1.  $x^3 - 8 = 0$

2.  $x^4 + x^2 - 6 = 0$

Handwritten work for problem 2:

$$u = x^2$$

$$u^2 + u - 6 = 0$$

$$(u+3)(u-2) = 0$$

$$u = -3 \quad u = 2$$

$$\sqrt{x^2} = \sqrt{3} \quad x^2 = 2$$

$$x = \pm i\sqrt{3} \quad x = \pm\sqrt{2}$$

Factored form:

$$1. (x-2)(x^2+2x+4) = 0$$

Roots for  $x^2+2x+4=0$ :

$$\frac{-2 \pm \sqrt{4-4(4)}}{2}$$

$$\frac{-2 \pm \sqrt{-12}}{2}$$

$$\frac{-2 \pm 2i\sqrt{3}}{2}$$

$$-1 \pm i\sqrt{3}$$

$$-1 - i\sqrt{3}$$

~~Test tomorrow~~ Wednesday

## 7.1 Polynomial Functions

- degree odd/even
- leading coeff. +/-
- end behavior
- # real zeros

## 7.2 Graphs

- use calc to find zeros, rel. max, and rel. min

## 7.3 Quadratic Techniques

- u-substitution
- factoring

## 7.4 Factor and Remainder Thms

- synthetic substitution
- k problems

## 7.5 Roots and Zeros

- Fund. thm. of algebra  $3+i \quad 3-i$
- complex conjugates  $3+\sqrt{2} \quad 3-\sqrt{2}$
- write equation, given the roots

Handwritten example:

$$(x-2)(x^2+9)=0$$

## 7.6 Rational Zero thm.

- p's and q's
- double roots
- constant = 0

Handwritten note:  $\frac{p}{q}$  and a graph of a rational function with a vertical asymptote.

## 7.7 Operations on Functions

- $+$   $-$   $\times$   $\div$
- Composition  $[f \circ g](x) \quad g(f(x))$

## 7.8 Inverse Functions

- Find the inverse
- Show it is the inverse  $[f \circ g](x) = x$   
 $[g \circ f](x) = x$
- Graph the inverse

Handwritten note:  $y = \sqrt{\text{Radical}}$

## 7.9 Square Root Functions and Inequalities

- graph (table of values)
- domain and range
- Inequalities

Handwritten note:  $\text{Radical} \geq 0$